

PATAGONIAN LITTLE ICE AGE REBOUND

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Observations of the Northern and Southern Patagonian icefields in the southernmost Andean Cordillera indicate that between 140 - 380 km³ of continental ice has been lost by mass wasting during the years 1944 - 1985. A number of less-quantitative observations strongly suggest that such a pattern of deterioration began between AD 1850 and 1900. Glacial moraine deposits suggest 3 additional episodes of regional glacial advancement during the mid to late-Holocene. We construct a late-Pleistocene and Holocene glacial load history and demonstrate the sensitivity of any geodetic measurement of present-day crustal uplift to the Little Ice Age and its timing and total mass change. If the viscosity of the mantle is one order of magnitude smaller than that characterizing Fennoscandia, then the uplift adjacent to the Southern Patagonian icefield is predicted to be on the order of 1 - 1.5 cm / yr. Geologically recent (0 - 12 Ma) northward migration of the Chile Triple Junction, and the slab window left in the wake of that migration, might be cause for such an a priori lower estimate of mantle viscosity. Neoglaciation of Patagonia during Europe's "Dark Ages" (circa AD 400 - 1000) might also contribute an additional 10 - 30 % to the predicted uplift signal. The observations of Masuma Aniya and colleagues pertaining to the 20th Century rate of glacial demise are crucial to the model. These rates, extrapolated back into the mid to late 19th Century, are the primary source for the prediction of rapid crustal deformation at the present-day.